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10/629,505	07/29/2003	Mike Sherback	49070/DMC/S965	6723

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EXAMINER	
SONG, SARAH U	

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 03/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,505	SHERBACK ET AL.	
	Examiner	Art Unit	
	Sarah Song	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15,20-26,32-37 and 39-46* is/are rejected.

7)☒ Claim(s) *14,16-19,27-31 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0903,1203*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The prior art documents submitted by the applicant in the Information Disclosure Statement filed on September 22, 2003 and December 8, 2003 have all been considered and made of record (note the attached copy of form PTO-1449).

Drawings

2. This application has been filed with twelve (12) sheets of drawings, which have been approved by the Examiner.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of **50 to 150 words**. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

4. Claim 12 is objected to because of the following informalities: in line 3, Examiner suggests inserting –said jig—before "including" in order to clarify which "providing" step is being further limited. Appropriate correction is required.

5. Claim 15 is objected to because of the following informalities: in line 1, Examiner suggests inserting –said plurality of optical components—after "positioning" in order to clarify which "positioning" step is being further limited. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 21, 24-26, 32, 33, 36 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Jerman et al. (U.S. Patent 6,473,553).**

8. Regarding claim 21, Jerman et al. discloses a method for optically coupling optical components, comprising: providing a jig 502/504; providing a base substrate 506; providing a plurality of optical components including a light source 128; and forming an optical subassembly by passively aligning said plurality of optical components using only said jig and joining said optical components to said base substrate. Jerman et al. discloses the alignment tolerance of the optical components to be aligned within 0.5 microns of the desired location. See column 6, lines 3-9. Therefore, Jerman et al. discloses that said optical components satisfy an alignment tolerance of +/- 5microns. See columns 4-6.

9. Regarding claim 24, Jerman et al. discloses an apparatus comprising jig stencil 502 having a plurality of openings that receive corresponding plurality of optical components therein and passively optically align said plurality of optical components to one another, at least one of said openings bounded by a retractable

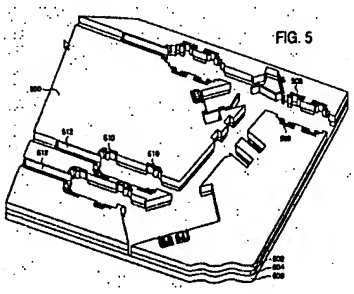
FIG. 5

portion 413 which contacts an associated one of said plurality of said optical components received in said opening.

10. Regarding claim 25, Jerman et al. discloses the alignment tolerance of the optical components to be aligned within 0.5 microns of the desired location. See column 6, lines 3-9. Therefore, Jerman et al. discloses that said jig stencil passively aligns said plurality of optical components to one another to satisfy an alignment tolerance of +/- 5 microns.

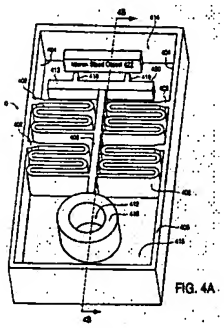
FIG. 4A

11. Regarding claim 26, at least one of said openings is bounded in part by a fixed reference surface 414 that positions an associated one of said plurality of said optical components within said openings and the opening is movable with respect to said plurality of optical components that are fixed with respect to each other via retractable portion 413. It appears that functional limitation for "during thermal processing" is met by the disclosed structure, since the jig material is silicon (column 4, lines 21-31) and the optical component materials may be made of a variety of materials, the coefficients of thermal expansion would likely differ, thus resulting in some degree of relative movement (expansion or contraction) between the components and the openings during thermal processing.

12. Regarding claim 32, Jerman et al. discloses an apparatus comprising: an alignment jig 502/504, an optical subassembly 110 comprising a plurality of optical components including a light source 128, and an optical transmission medium 130, said optical subassembly and said plurality of optical components arranged such that light emitted by said optical source is directed to said optical transmission medium by further of said plurality of optical elements, and said

optical subassembly includes alignment tolerances obtainable with said alignment jig. See Abstract.

13. Regarding claim 33, Jerman et al. discloses the alignment tolerance of the optical components to be aligned within 0.5 microns of the desired location. See column 6, lines 3-9. Therefore, Jerman et al. discloses that said optical components are aligned within an alignment tolerance of +/- 5microns.

14. Regarding claim 36, said plurality of optical components further includes a collimating lens 113 and a focusing lens 124 positioned along an optical path of light emitted by said light source.

15. Regarding claim 37, said alignment jig includes jig stencil 502 including a plurality of openings for receiving said optical components, at least one of said openings bounded in part by a retractable portion 413.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. **Claims 1-13, 15, 20, 22,23, 34, 35 and 39-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jerman et al.**

18. Regarding claim 1, Jerman et al. discloses a method for optically coupling optical components, comprising: providing a base substrate 506; providing a plurality of optical components including a light source 128 and an adjustable optical element 118; forming an

optical subassembly 110 by passively aligning said plurality of optical components using a jig 502/504 and joining said plurality of optical components to said base substrate 506; passively aligning said optical subassembly to an optical transmission medium 130; and adjusting said adjustable optical element 118. See column 5, lines 10-40.

19. Jerman et al. does not expressly discloses that the step of adjusting said adjustable optical element is performed such that optical power of light emitted by said light source and directed into said optical transmission medium is maximized. However, the adjustment of adjustable optical elements is typically performed in the art in order to maximize the optical power emitted through a transmission medium. Therefore, it would have been obvious to one having ordinary skill in the art to perform the adjustment step to maximize transmission in order to provide a high power signal for downstream detection.

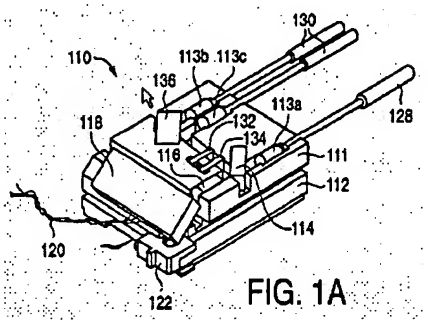

FIG. 1A

20. Regarding claim 2, the jig 111 includes a jig stencil 502 having a corresponding plurality of openings therethrough; and said passively aligning includes positioning said plurality of optical components within said corresponding plurality of openings. See column 6, lines 15-32.

21. Regarding claims 3 and 4, said adjustable optical element comprises a dynamic mirror, wherein said adjusting includes causing said light source to emit light and mechanically adjusting said mirror. See column 5, lines 10-18.

22. Jerman et al. does not expressly disclose the dynamic mirror to be a MEMS. However, MEMS mirrors are well known in the art as compact dynamic mirrors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide

a MEMS mirror as the dynamic mirror in order to provide a low head mass. See column 5, line 64 through column 6 line 1.

23. Regarding claim 5, Jerman et al. discloses the alignment tolerance of the optical components to be aligned within 0.5 microns of the desired location. See column 6, lines 3-9. Therefore, Jerman et al. discloses said passively aligning includes positioning said optical components to satisfy an alignment tolerance or about +/- 5 microns.

24. Regarding claim 6, Jerman et al. discloses joining comprising glue or epoxy or other material, but does not expressly disclose forming a solder layer between the components and the base substrate, and heating to join said optical components to said base. See column 4, lines 56-60. Soldering is well known in the art to provide a strong joint. Therefore, it would have been obvious to one having ordinary skill in the art to form a solder layer (instead of glue or epoxy) to bond the components in order to provide a rugged joint. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the joint between the components and the base substrate in order to provide sufficient surface area for good adhesion of the solder. Also, it is noted that the step of soldering inherently comprises the step of heating.

25. Regarding claim 7, said passively aligning said optical subassembly to an optical transmission medium includes the use of at least one mechanical guide. See Figure 1A.

26. Regarding claim 8, Jerman et al. discloses a method for optically coupling optical components, comprising: providing a base substrate 506; providing plurality optical components including a light source 128; providing a jig 502/504; aligning said plurality of optical components using said jig such that said light source is optically aligned to further of said optical

components (e.g. 136); and joining said optical components to said base substrate such that said light source remains optically aligned to said further of said optical components.

27. Jerman et al. discloses joining comprising glue or epoxy or other material, but does not expressly disclose forming a solder layer between the components and the base substrate, and heating to join said optical components to said base. See column 4, lines 56-60. Soldering is well known in the art to provide a strong joint. Therefore, it would have been obvious to one having ordinary skill in the art to form a solder layer (instead of glue or epoxy) to bond the components in order to provide a rugged joint. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the joint between the components and the base substrate in order to provide sufficient surface area for good adhesion of the solder. Also, it is noted that the step of soldering inherently comprises the step of heating.

28. Regarding claim 9, the optical components includes an adjustable optical element 118 and said light source emits light, and the method further comprising providing an optical transmission medium 130 and using passive alignment to optically couple said optical transmission medium to said light source. See Figure 1A.

29. Regarding claim 10, said adjustable optical element comprises a dynamic mirror, wherein said adjusting includes causing said light source to emit light and mechanically adjusting said mirror. See column 5, lines 10-18.

30. Jerman et al. does not expressly disclose the dynamic mirror to be a MEMS. However, MEMS mirrors are well known in the art as compact dynamic mirrors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide

a MEMS mirror as the dynamic mirror in order to provide a low head mass. See column 5, line 64 through column 6, line 1.

31. Furthermore, Jerman et al. does not expressly discloses that the step of adjusting said adjustable optical element is performed such that optical power of light emitted by said light source and directed into said optical transmission medium is maximized. However, the adjustment of adjustable optical elements is typically performed in the art in order to maximize the optical power emitted through a transmission medium. Therefore, it would have been obvious to one having ordinary skill in the art to perform the adjustment step to maximize transmission in order to provide a high power signal for downstream detection.

32. Regarding claim 11, it is noted that the step of soldering inherently comprises the step of heating. Also, Jerman et al. discloses the alignment tolerance of the optical components to be aligned within 0.5 microns of the desired location. See column 6, lines 3-9. Therefore, Jerman et al. discloses said passively aligning includes positioning said optical components to satisfy an alignment tolerance or about +/- 5 microns.

33. Regarding claim 12, said jig 502/504 comprises a corresponding plurality of openings therethrough, said providing said jig includes positioning said jig over said base substrate 506, and said aligning includes positioning said plurality of optical components within said corresponding plurality of openings.

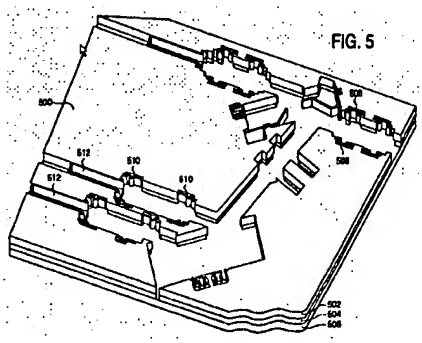
FIG. 5

34. Regarding claim 13, said positioning includes positioning at least one of said optical components within a corresponding one of said openings and contacting a retractable portion 210

that forms part of a border of said corresponding opening, said retractable portion resiliently urging said at least one of said optical components into alignment position. See column 6, lines 33-64.

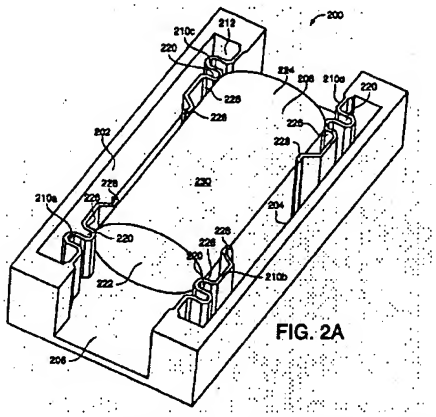

FIG. 2A

35. Regarding claim 15, Jerman et al. also discloses said positioning includes retracting said retractable portion from said opening then inserting said at least one of said optical components within said corresponding opening. See column 8, lines 57-61.

36. Regarding claim 20, Jerman et al. does not expressly disclose said joining to include soldering said optical components substantially simultaneously. However, it would have been obvious to one of ordinary skill in the art to solder the components substantially simultaneously in order to avoid unintentional reflow of solder joints of proximate components and also to result in time efficiency of assembly.

37. Regarding claim 22, Jerman et al. further discloses an adjustable optical element 118, and passively aligning said optical subassembly to an optical transmission medium 130, but does not expressly discloses that the step of adjusting said adjustable optical element is performed such that optical power of light emitted by said light source and directed into said optical transmission medium is maximized. However, the adjustment of adjustable optical elements is typically performed in the art in order to maximize the optical power emitted through a transmission medium. Therefore, it would have been obvious to one having ordinary skill in the art to perform the adjustment step to maximize transmission in order to provide a high power signal for downstream detection.

38. Regarding claim 23, said adjustable optical element comprises a dynamic mirror 118, wherein said adjusting includes causing said light source to emit light and mechanically adjusting said mirror. See column 5, lines 10-18.

39. Jerman et al. does not expressly disclose the dynamic mirror to be a MEMS. However, MEMS mirrors are well known in the art as compact dynamic mirrors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a MEMS mirror as the dynamic mirror in order to provide a low head mass. See column 5, line 64 through column 6 line 1.

40. Regarding claims 34 and 35, said adjustable optical element comprises a dynamic mirror, wherein said adjusting includes causing said light source to emit light and mechanically adjusting said mirror. See column 5, lines 10-18.

41. Jerman et al. does not expressly disclose the dynamic mirror to be a MEMS. However, MEMS mirrors are well known in the art as compact dynamic mirrors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a MEMS mirror as the dynamic mirror in order to provide a low head mass. See column 5, line 64 through column 6 line 1.

42. Furthermore, Jerman et al. does not expressly discloses the MEMS positioned such that optical power of light emitted by said light source and directed into said optical transmission medium is maximized. However, the adjustment of adjustable optical elements is typically performed in the art in order to maximize the optical power emitted through a transmission medium. Therefore, it would have been obvious to one having ordinary skill in the art to

position the MEMS to maximize transmission in order to provide a high power signal for downstream detection, resulting in a low loss device.

43. Regarding claim 39, Jerman et al. discloses an optical subassembly 110 comprising a plurality of optical components including a light source 128 and an adjustable mirror structure 118 and satisfying an alignment tolerance of +/-5 microns, said plurality of optical components optically aligned to one another using only a jig 502/504. See column 6, lines 3-9.

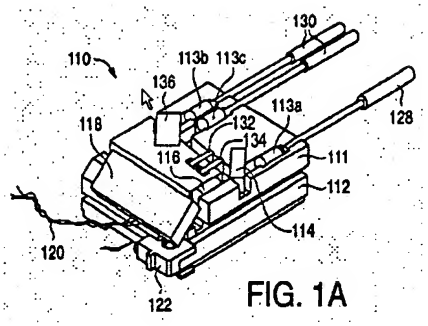

FIG. 1A

44. Jerman et al. does not expressly disclose the adjustable mirror to be a MEMS. However, MEMS mirrors are well known in the art as compact adjustable mirrors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a MEMS mirror as the adjustable mirror in order to provide a low head mass. See column 5, line 64 through column 6 line 1.

45. Regarding claim 40, Jerman et al. discloses an optical fiber 130 optically coupled to said of optical components. Jerman et al. does not expressly disclose the coupling such that optical power of light emitted by said light source and directed into said optical fiber is maximized. However, the alignment of optical components is typically performed in the art in order to maximize the optical power emitted through a transmission medium such as an optical fiber. Therefore, it would have been obvious to one having ordinary skill in the art to couple the components and the fiber in order to provide a high power signal for downstream detection, resulting in a low loss device.

46. Regarding claims 41, Jerman et al. discloses an optical subassembly optical components including a light source 128 and an adjustable mirror 118 and satisfying an alignment tolerance of +/- 5 microns, said plurality of optical components optically passively aligned to on another using a jig 502/504.

47. Jerman et al. does not expressly disclose the adjustable mirror to be a MEMS. However, MEMS mirrors are well known in the art as compact adjustable mirrors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a MEMS mirror as the adjustable mirror in order to provide a low head mass. See column 5, line 64 through column 6 line 1.

48. Regarding claim 42, the optical subassembly further includes an optical fiber 130 optically coupled to said plurality of optical components. Jerman et al. does not expressly disclose the coupling such that optical power of light emitted by said light source and directed into said optical fiber is maximized. However, the alignment of optical components is typically performed in the art in order to maximize the optical power emitted through a transmission medium such as an optical fiber. Therefore, it would have been obvious to one having ordinary skill in the art to couple the components and the fiber in order to provide a high power signal for downstream detection, resulting in a low loss device.

49. Regarding claim 43 and 45, Jerman et al. discloses an apparatus comprising an optical transmission medium 130 and an optical subassembly 110 having optical components including a light source 128 and an adjustable mirror 118, said optical components aligned to one another using only a jig 502/504.

50. Jerman et al. does not expressly disclose the adjustable mirror to be a MEMS. However, MEMS mirrors are well known in the art as compact adjustable mirrors. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a MEMS mirror as the adjustable mirror in order to provide a low head mass. See column 5, line 64 through column 6 line 1.

51. Jerman et al. discloses an optical fiber 130 optically coupled to said of optical components. Jerman et al. does not expressly disclose the coupling such that optical power of light emitted by said light source and directed into said optical fiber is maximized. However, the alignment of optical components is typically performed in the art in order to maximize the optical power emitted through a transmission medium such as an optical fiber. Therefore, it would have been obvious to one having ordinary skill in the art to couple the components and the fiber in order to provide a high power signal for downstream detection, resulting in a low loss device.

52. Regarding claims 44 and 46, said optical transmission medium 130 is passively aligned to said optical components of said optical subassembly via the grooves in the subassembly. See Figure 1A.

Allowable Subject Matter

53. Claims 14, 16-9, 27-31 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

54. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or reasonably suggest, either alone or in combination,

the claimed invention further comprising the step in which said joining comprises heating and further comprising cooling after said heating, and in which said jig has a thermal coefficient of expansion different from a thermal coefficient of expansion of said base substrate and said retractable portion retracts allow said jig to move relative to said optical components, during said cooling, as claimed in claim 14; in which said joining comprises heating to join said optical components to said base substrate and further comprising subsequently cooling, and said jig moves relative to said optical components thereby preventing said joined optical components from moving with respect to said base substrate, during said step of cooling, as claimed in claim 16; the method further comprising providing a jig clamp having base section coupled to movable cover, and in which said providing a base substrate comprises positioning said base substrate on said base section, and further comprising positioning said cover over said plurality optical components to urge said plurality of optical components toward said base substrate, as claimed in claim 17-19; the apparatus further comprising jig clamp for securing said plurality of optical components disposed within said openings, to a base substrate, said jig clamp including a base and cover, as claimed in claims 27-31; and the apparatus wherein in which said jig stencil and said base substrate include different coefficients of thermal expansion and said retractable surface portion substantially precludes said optical components from moving with respect said base substrate when said base substrate and said optical components are heated then cooled, as claimed in claim 38. Jerman et al. does not render obvious the modifications to arrive at the claimed invention as noted above.

Conclusion

55. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Song whose telephone number is 571-272-2359. The examiner can normally be reached on M-Th 7:30am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sarah Song
Patent Examiner
Group Art Unit 2874